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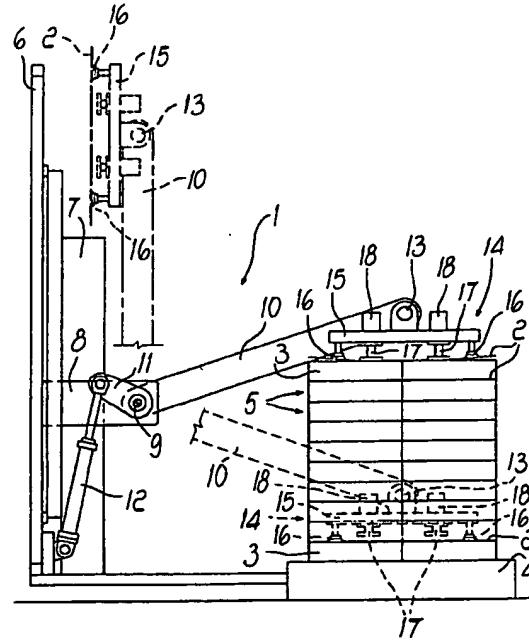
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### (54) Method for extracting intermediate flat supports for stacks of products

(57) A method for extracting intermediate flat supports (2) of stacks (3) of products wherein a grip element (14) is placed above a flat support (2) to be extracted and presser means (17), carried by the grip element (14), are activated so as to act on the stacks (3) that lie below the flat support (2), with the flat support (2) being interposed; the flat support (2) is then lifted, at its peripheral region, by virtue of a plurality of suckers (16) carried by the grip element (14) and capable of retaining the flat support (2) when the pressers (17) are deactivated; and finally, the grip element (14) is placed at a container (7) for collecting the extracted flat support (2).



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## Description

The present invention relates to a method for extracting intermediate flat supports for stacks of products.

In particular, the invention relates to a method for extracting intermediate flat supports for stacks of cardboard cutouts arranged on pallets and the like.

Devices are currently known which allow to pick up stacks of cutouts, such as for example those used to package cigarette packets of the rigid flip-top type. These stacks of cutouts are generally arranged on a pallet-like support in multiple rows and in a plurality of layers that are separated from one another, in pairs, by an intermediate flat support constituted for example by a sheet of paper of appropriate thickness.

These devices pick up the stacks of cutouts in an orderly fashion and then transfer them to an inlet of a user machine.

Once the transfer of an entire layer of stacks of cutouts has been completed, the intermediate flat support is extracted.

For this purpose, there are provided appropriate devices which have means for gripping said intermediate flat support and are constituted for example by sucker-fitted suction means.

Said grip means are capable of moving between a position for picking up the intermediate flat supports and a position for releasing said intermediate flat supports inside a collecting container.

In known extraction devices, in many cases the cutouts arranged at the top of the stacks of the layer that lies below the flat support to be extracted cling to said flat support when it is picked up by said sucker-fitted suction means.

Due to the porosity of the material that constitutes the flat support, the suction of the suckers also affects the cutouts arranged at the regions where said suckers are applied.

Furthermore, more generally, the lifting of the flat support tends to produce, with known extraction devices, a movement of the cutouts located at the top of the stacks with respect to the lower ones, due to adhesion between said flat support and said cutouts.

A principal aim of the present invention is to provide an extraction method that allows to eliminate the above-described drawback, extracting the intermediate flat supports without interfering with the stacks of products.

According to the present invention, a method is provided for extracting intermediate flat supports of stacks of products, characterized in that it comprises the steps of: moving a grip element above a flat support to be extracted; activating presser means, carried by said grip element, to act on the stacks lying below said flat support, by virtue of the interposition of said flat support; lifting said flat support, at its peripheral region, by virtue of suction means carried by said grip element, and deactivating said presser means; and moving said grip

element to place said grip element at means for collecting said extracted flat support.

Preferably, the step of moving said element above said flat support to be extracted is performed by moving said suction means into contact with said flat support.

The invention is now described with reference to the accompanying drawing, which illustrates a non-limitative embodiment thereof, in which the only figure is a schematic side view of an extraction device that performs the method according to the present invention.

With reference to the above figure, the reference numeral 1 designates a device for extracting intermediate flat supports 2 for stacks 3 of cutouts, such as for example those used to package cigarette packets of the rigid type.

The stacks 3 of cutouts are arranged in an orderly fashion on pallet-like supporting means 4. In particular, the stacks 3 of cutouts are arranged so as to form superimposed layers 5 that are separated from one another by virtue of the intermediate flat supports 2, which are made of flexible material, for example paper.

The extraction device 1 includes a vertical framework 6 provided with a container 7 for collecting the extracted flat supports 2. Said framework 6 is provided, in a substantially median position, with a bracket 8, and an arm 10 which oscillates on a vertical plane is pivoted to said bracket 8 by means of a pivot 9 having a horizontal axis. The arm 10 is actuatable, by means of a crank 11, by a jack 12 that is pivoted to said framework 6.

A grip element 14 is articulated to the free end of the oscillating arm 10 by means of a pivot 13 having a horizontal axis. Said grip element 14 comprises a frame 15 provided with suction means 16 that are constituted for example by a plurality of suckers 16 adapted to be connected to appropriate known suction devices, which are not shown in the figure. The grip element 14 is furthermore provided, on the same side as the suckers 16, with a plurality of presser elements 17 that are actuatable by respective actuators 18 along axes that are perpendicular to the frame 15.

The suckers 16 are arranged at opposite ends of the frame 15, so as to act at the peripheral region of the flat support 2 to be extracted, while the pressers 17 are arranged in a central region of said frame 15.

The method for extracting the intermediate flat supports 2 entails a first step during which, by rotating the oscillating arm 10, actuated by the jack 12, the frame 15 is placed above the flat support 2 to be extracted so that the suckers 16 are arranged in contact with said flat support 2.

It should be pointed out that for the sake of clarity said first step is shown in the accompanying figure with the frame 15 arranged (dashed line) above a flat support 2 that separates two lower layers 5 of stacks 3.

Thereafter the presser elements 17 are actuated by the actuators 18. Said pressers 17 act on the stacks 3 that lie below the flat support 2 to be extracted, by virtue of the interposition of said flat support 2, in order to

apply a constant pressure that is directed towards the pallet 4 and is capable of blocking said stacks 3.

Then, first the suction means connected to the suckers 16 are activated and thereafter an upward rotation of the arm 10 is actuated the extent whereof is such as to cause a slight lifting of the frame 15 and accordingly a slight curving of the flat support 2, the peripheral region whereof is raised with respect to the cutouts that constitute the top of the stack 3. This step of the operation of the device 1 is shown (in solid lines) in the upper part of the figure, with reference to the removal of the upper flat support 2.

The subsequent deactivation of the actuators 18 that actuate the pressers 17 allows the flat support 2 to fully separate from the stacks 3 and to continue to be retained against the frame 15 by means of the suckers 16, preventing relative movements of the cutouts that lie below said flat support 2.

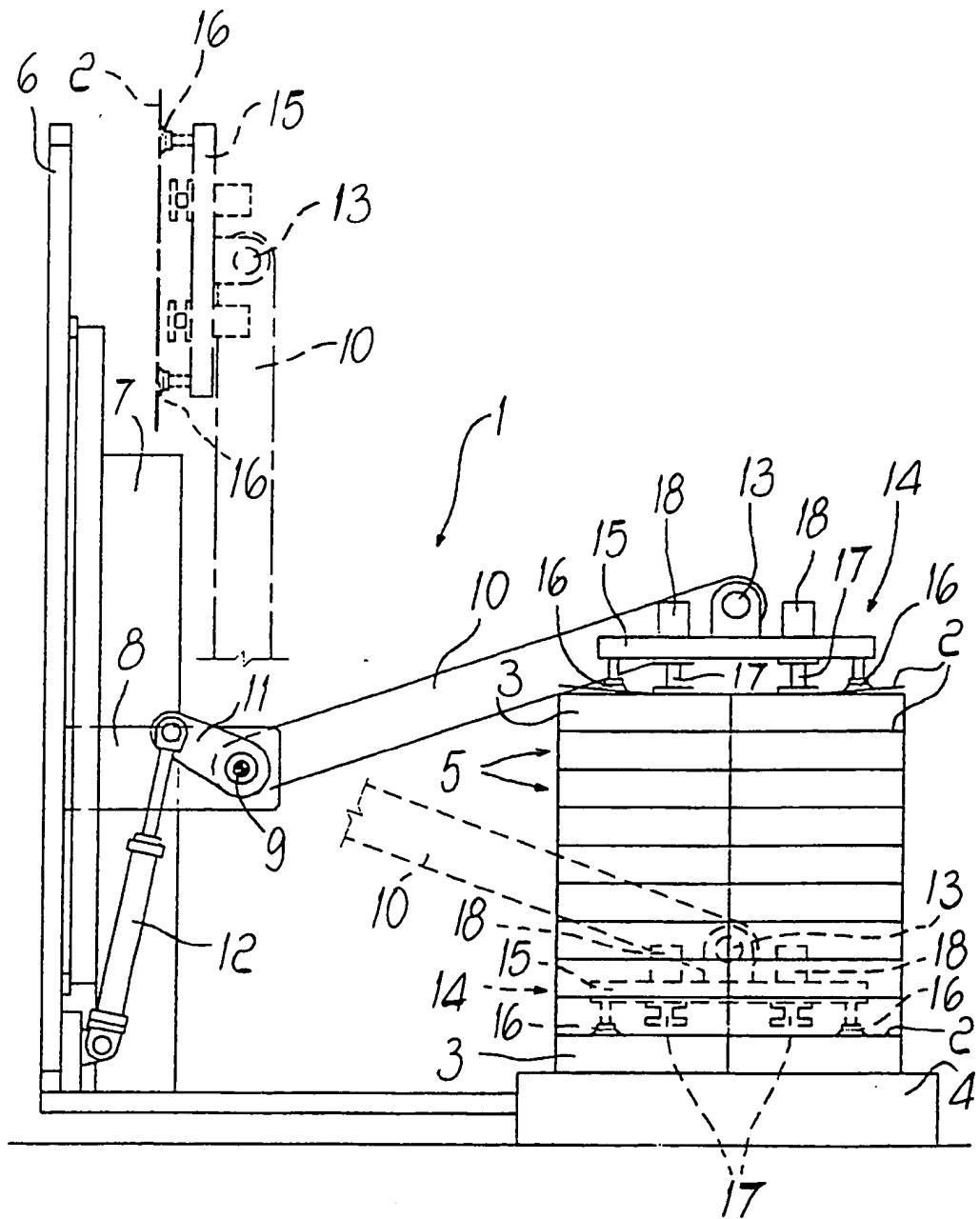
Finally, the rotation of the oscillating arm 10 is completed, and said arm is arranged in a vertical position (dot-and-dash line), while known actuators, not shown, are actuated to turn the frame 15 about the pivot 13 and move said frame 15 into a vertical position (dot-and-dash line) at the container 7, inside which the extracted flat support 2 is allowed to drop as a consequence of the deactivation of said suction means.

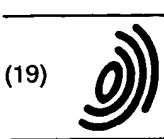
Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

**Claims** 35

1. A method for extracting intermediate flat supports (2) of stacks (3) of products, characterized in that it comprises the steps of: moving a grip element (14) above a flat support (2) to be extracted; activating presser means (17), carried by said grip element (14), to act on the stacks (3) that lie below said flat support (2), with said flat support (2) being interposed; lifting said flat support (2), at its peripheral region, by virtue of suction means (16) carried by said grip element (14), and deactivating said presser means (17); and moving said grip element (14) to place said grip element (14) at means (7) for collecting said extracted flat support (2).

2. Method according to claim 1, characterized in that said step of placing said grip element (14) above said flat support (2) to be extracted is performed by moving said suction means (16) into contact with said flat support (2).





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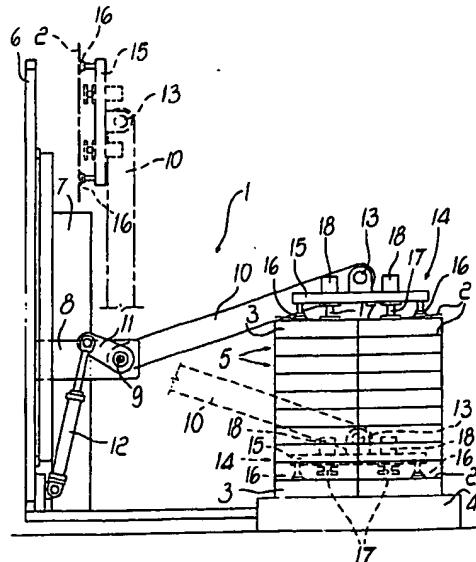
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## EUROPEAN SEARCH REPORT

Application Number  
EP 96 10 7483

DOCUMENTS CONSIDERED TO BE RELEVANT									
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)						
X	PATENT ABSTRACTS OF JAPAN vol. 11, no. 25 (M-556) [2472], 23 January 1987 & JP 61 197334 A (MATSUSHITA ELECTRIC), 1 September 1986, * abstract *	1,2	B65H3/08						
X	WO 90 04558 A (CIMCORP OY) * page 6, line 8 - page 7, line 19; figures 1,4A-4E *	1,2							
X	PATENT ABSTRACTS OF JAPAN vol. 9, no. 84 (M-371) [1807], 13 April 1985 & JP 59 212335 A (FUJI SHASHIN FILM), 1 December 1984, * abstract *	1,2							
X	EP 0 486 719 A (ALUMINIUM COMPANY OF AMERICA) * column 3, line 25 - column 5, line 44; figures *	1,2							
X	PATENT ABSTRACTS OF JAPAN vol. 17, no. 324 (M-1433), 21 June 1993 & JP 05 038693 A (FANUC), 19 February 1993, * figure *	1,2							
A	EP 0 437 760 A (FOCKE & CO.) * column 4, line 2 - column 8, line 19; figures *	1,2							
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>BERLIN</td> <td>21 August 1997</td> <td>Fuchs, H</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	BERLIN	21 August 1997	Fuchs, H
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BERLIN	21 August 1997	Fuchs, H							
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document							
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